

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Applicant : Lyle Grosbach et al.
Application No. : 10/675,677
Filed : September 30, 2003
For : HIERARCHICAL SCHEDULING
Examiner : Ian Moore
Art Unit : 2416

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

BRIEF ON APPEAL

Dear Sir:

In response to the decision of the Examiner in the Final Office Action dated May 14, 2008, finally rejecting claims 1-18, a Notice of Appeal was filed on September 15, 2008. Appellants/Applicants submit the following Brief on Appeal in compliance with 37 CFR § 41.37. For the reasons more fully set forth below, it is respectfully submitted that the final rejections of claims 1-18 should be reversed.

REAL PARTY IN INTEREST:

The real party in interest is INTERNATIONAL BUSINESS MACHINES CORPORATION, the assignee of the subject application.

RELATED APPEALS AND INTERFERENCES:

Appellants/Applicants and Appellants/Applicants' legal representative do not know of any prior or pending appeals, interferences or judicial proceedings which may be related to, directly affect or be directly affected by, or have a bearing on, the Board's decision in this appeal.

STATUS OF CLAIMS:

Claims 1-18 have been rejected and are on appeal.

STATUS OF AMENDMENTS:

An Amendment after the Final Office Action (request for reconsideration) was filed on July 14, 2008. The request was considered as indicated by the Advisory Action mailed on July 25, 2008.

SUMMARY OF CLAIMED SUBJECT MATTER:

Claim 1

Independent claim 1 is directed to a method. The method comprises selecting a first winning entry from one of a plurality of main calendars during a time unit, the first winning entry indicating a first pipe to be serviced during the time unit (e.g., operation 704 of FIG. 7 and as described on page 30, lines 22-30 of the specification). The method further comprises determining that no pipe flow corresponding to the winning first pipe currently needs to be serviced during the time unit (e.g., operation 710 of FIG. 7 and as described from page 30, line 30 to page 31, line 2 of the specification). The method further comprises selecting a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating a second pipe or an autonomous flow to be serviced during the time unit (e.g., operation 712 of FIG. 7 and as described on page 31, lines 13-25 of the specification). The method further comprises servicing the autonomous flow or a pipe flow corresponding to the second winning entry during the time unit (e.g., operation 718 of FIG. 7 and as described on page 32, lines 3-20 of the specification).

Claim 12

Independent claim 12 is directed to a network processor system. The system comprises at least one memory adapted to store one or more quality of service priority parameters corresponding to one or more pipes and pipe flows (e.g., memory 304 of FIG. 3 and as described on page 20, lines 2-20 of the specification). The system further comprises scheduler logic, coupled to the at least one memory,

to select a first winning entry from one of a plurality of main calendars during a time unit, the first winning entry indicating a first pipe to be serviced during the time unit (e.g., operation 704 of FIG. 7 and as described on page 30, lines 22-30 of the specification). The scheduler logic is further to determine that no pipe flow corresponding to the winning first pipe currently needs to be serviced during the time unit (e.g., operation 710 of FIG. 7 and as described from page 30, line 30 to page 31, line 2 of the specification). The scheduler logic is further to select a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating a second pipe or autonomous flow to be serviced during the time unit (e.g., operation 712 of FIG. 7 and as described on page 31, lines 13-25 of the specification). The scheduler logic is further to service the autonomous flow or pipe flow corresponding to the second winning entry during the time unit (e.g., operation 718 of FIG. 7 and as described on page 32, lines 3-20 of the specification).

Claim 15

Independent claim 15 is directed to a method. The method comprises selecting a first winning entry from one of a plurality of main calendars during a time unit, the first winning entry indicating a first pipe to be serviced during the time unit (e.g., operation 704 of FIG. 7 and as described on page 30, lines 22-30 of the specification). The method further comprises determining that no pipe flow corresponding to the winning first pipe currently needs to be serviced during the time unit (e.g., operation 710 of FIG. 7 and as described from page 30, line 30 to page 31, line 2 of the specification). The method further comprises selecting a

second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating a second pipe to be serviced during the time unit (e.g., operation 712 of FIG. 7 and as described on page 31, lines 13-25 of the specification).

The method further comprises servicing a pipe flow corresponding to the second winning entry during the time unit (e.g., operation 718 of FIG. 7 and as described on page 32, lines 3-20 of the specification).

Claim 16

Independent claim 16 is directed to a method. The method comprises selecting a first winning entry from one of a plurality of main calendars during a time unit, the first winning entry indicating a first pipe to be serviced during the time unit (e.g., operation 704 of FIG. 7 and as described on page 30, lines 22-30 of the specification). The method further comprises determining that no pipe flow corresponding to the winning first pipe currently needs to be serviced during the time unit (e.g., operation 710 of FIG. 7 and as described from page 30, line 30 to page 31, line 2 of the specification). The method further comprises selecting a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating an autonomous flow to be serviced during the time unit (e.g., operation 712 of FIG. 7 and as described on page 31, lines 13-25 of the specification).

The method further comprises servicing the autonomous flow corresponding to the second winning entry during the time unit (e.g., operation 718 of FIG. 7 and as described on page 32, lines 3-20 of the specification).

Claim 17

Independent claim 17 is directed to a network processor system. The system comprises at least one memory adapted to store one or more quality of service priority parameters corresponding to one or more pipes and pipe flows (e.g., memory 304 of FIG. 3 and as described on page 20, lines 2-20 of the specification). The system further comprises scheduler logic, coupled to the at least one memory, to select a first winning entry from one of a plurality of main calendars during a time unit, the first winning entry indicating a first pipe to be serviced during the time unit (e.g., operation 704 of FIG. 7 and as described on page 30, lines 22-30 of the specification). The scheduler logic is further to determine that no pipe flow corresponding to the winning first pipe currently needs to be serviced during the time unit (e.g., operation 710 of FIG. 7 and as described from page 30, line 30 to page 31, line 2 of the specification). The scheduler logic is further to select a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating a second pipe to be serviced during the time unit (e.g., operation 712 of FIG. 7 and as described on page 31, lines 13-25 of the specification). The scheduler logic is further to service a pipe flow corresponding to the second winning entry during the time unit (e.g., operation 718 of FIG. 7 and as described on page 32, lines 3-20 of the specification).

Claim 18

Independent claim 18 is directed to a network processor system. The system comprises at least one memory adapted to store one or more quality of service priority parameters corresponding to one or more pipes and pipe flows (e.g., memory 304 of FIG. 3 and

as described on page 20, lines 2-20 of the specification). The system further comprises scheduler logic, coupled to the at least one memory, to select a first winning entry from one of a plurality of main calendars during a time unit, the first winning entry indicating a first pipe to be serviced during the time unit (e.g., operation 704 of FIG. 7 and as described on page 30, lines 22-30 of the specification). The scheduler logic is further to determine that no pipe flow corresponding to the winning first pipe currently needs to be serviced during the time unit (e.g., operation 710 of FIG. 7 and as described from page 30, line 30 to page 31, line 2 of the specification). The scheduler logic is further to select a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating an autonomous flow to be serviced during the time unit (e.g., operation 712 of FIG. 7 and as described on page 31, lines 13-25 of the specification). The scheduler logic is further to service the autonomous flow corresponding to the second winning entry during the time unit (e.g., operation 718 of FIG. 7 and as described on page 32, lines 3-20 of the specification).

"Means" Or "Step"

None of the claims contain an element expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL:

Claims 1-12 and 14-18 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,272,109 to Pei et al. [hereinafter *Pei*]. Claim 13 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Pei* in view of U.S. Patent No. 6,560,230 to Li [hereinafter *Li*].

ARGUMENT:

REVIEW OF CITED ART

Pei

Pei is directed to “techniques and devices for scheduling asynchronous transfer mode (ATM) traffic, for different bit rate services assigned to virtual circuit connections within a plurality of virtual path connections, for transmission over an ATM link.”

Pei, col. 1, lines 6-10.

Pei includes FIG. 5, which “depicts a simplified example of a first table embodiment.” *Pei*, col. 10, lines 45-46. As expressly discussed in *Pei*, “[t]he scheduling table includes multiple lines indexed by cell transmit time.” Col. 10, lines 47-48. *Pei* goes on to expressly state that “[i]n operation, the scheduler traverses the table as it increments the cell transmit time.” Col. 11, lines 8-10.

The citation to *Pei* does not discuss, for example, selecting a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating a second pipe or an autonomous flow to be serviced during the time unit.

Li

Li is directed to "scheduling data packets for transmission over a data link." *Li*, col. 1, lines 18-20

The citation to *Li* does not discuss, for example, selecting a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating a second pipe or an autonomous flow to be serviced during the time unit.

A PRIMA FACIE CASE OF ANTICIPATION OF CLAIMS 1-12 AND 14-18 HAS NOT BEEN ESTABLISHED AS IT HAS NOT BEEN SHOWN THAT PEI DISCLOSES EVERY FEATURE OF THE CLAIMS

Appellants/Applicants respectfully submit that the record fails to establish that each feature of claims 1-12 and 14-18 is disclosed by *Pei*. Accordingly, Appellants/Applicants respectfully submit that the rejection fails to establish a prima facie case of anticipation.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Manual of Patent Examination Procedure* § 2131, (8th Ed. 2001) (Rev. 7, July 2008) (citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). "The identical invention must be shown in as complete detail as is contained in

the ... claim." Id. (citing *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)). Further, "[t]he elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required." Id. (citing *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990)).

Independent claims 1, 12, 15, 16, 17, and 18 recite, respectively:

selecting a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating a second pipe or an autonomous flow to be serviced during the time unit[;]

select a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating a second pipe or autonomous flow to be serviced during the time unit [;]

selecting a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating a second pipe to be serviced during the time unit [;]

selecting a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating an autonomous flow to be serviced during the time unit [;]

select a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating a second pipe to be serviced during the time unit[; and]

select a second winning entry from the plurality of main calendars during the time unit, the

second winning entry indicating an autonomous flow to be serviced during the time unit[.]

Appellants/Applicants respectfully submit that *Pei* fails to disclose at least these features. Specifically, Appellants/Applicants respectfully submit that *Pei* does not disclose, for example, selecting a second winning entry from the plurality of main calendars **during the time unit**, the second winning entry indicating a second pipe or an autonomous flow **to be serviced during the time unit**.

Appellants/Applicants respectfully note the express claim language “during **the** time unit.” This express claim language is recited in each of the above features.

In the Final Office Action, the rejection relies on operations S5-S9, S11, and S13 in conjunction with FIG. 5 of *Pei* for disclosing the above features. However, the cited operations of *Pei* (S5-S9, S11, and S13) do not explicitly address timing. Rather, the rejection appears to rely **only** on FIG. 5 of *Pei* for disclosing the timing feature. See, e.g., *Advisory Action*, page 2, paragraph 2 (“*Pei* discloses selecting a first winning entry (see FIG. 5, identify/select a first content/entry) from one of a plurality of main calendars (see FIG. 5, from lists in the schedule table) during a time unit (see FIG. 5, during a time)...”).

FIG. 5 of *Pei* actually discloses a table, each row of which represents a different cell transmit time. As noted above, “[t]he scheduling table includes multiple lines indexed by cell transmit time.” *Pei*, col. 10, lines 47-48. “In operation, the scheduler traverses the table as it increments the cell transmit time.” Col. 11, lines 8-10. Thus, *Pei* cannot properly be relied upon for disclosing, for example, selecting a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating a second pipe or an autonomous flow to be serviced during the time unit.

Accordingly, withdrawal of the rejection is respectfully requested.

A PRIMA FACIE CASE OF OBVIOUSNESS OF CLAIM 13 HAS NOT BEEN ESTABLISHED AS IT HAS NOT BEEN SHOWN THAT THE PROPOSED COMBINATION OF PEI AND LI DISCLOSE EVERY FEATURE OF THE CLAIM

Claim 13 dependent from independent claim 12. It is respectfully submitted that the citation to *Li* fails to cure the deficiencies in the rejection of independent claim 12. Accordingly, withdrawal of the rejection is respectfully requested.

CONCLUSION

In summary, Appellants/Applicants respectfully submit that claims 1-18 patentably define over the prior art. Reversal of the Examiner's rejections is respectfully requested.

Respectfully Submitted,



Steven M. Santisi, Esq.
Registration No. 40,157
Dugan & Dugan, PC
Attorneys for Appellant
(914) 579-2200

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Hawthorne, New York

CLAIM APPENDIX

Claim 1 (Original): A method comprising:

selecting a first winning entry from one of a plurality of main calendars during a time unit, the first winning entry indicating a first pipe to be serviced during the time unit;

determining that no pipe flow corresponding to the winning first pipe currently needs to be serviced during the time unit;

selecting a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating a second pipe or an autonomous flow to be serviced during the time unit; and

servicing the autonomous flow or a pipe flow corresponding to the second winning entry during the time unit.

Claim 2 (Previously Presented): The method of claim 1 wherein selecting the first entry from one of the plurality of main calendars during the time unit includes selecting the first winning entry from a highest priority calendar that indicates an entry that needs to be serviced.

Claim 3 (Original): The method of claim 1 wherein the first winning entry includes a first entry of a chain, the chain includes a plurality of pipe entries scheduled to be serviced during the time unit.

Claim 4 (Original): The method of claim 1 wherein selecting the first winning entry from one of the plurality of main calendars during the time unit includes selecting the first winning entry from

one of the plurality of main calendars, each of which is of the different priority, during the time unit.

Claim 5 (Original): The method of claim 1 wherein selecting the first winning entry from one of the plurality of main calendars during the time unit includes selecting the first winning entry from one of the plurality of main calendars during a plurality of clock cycles.

Claim 6 (Previously Presented): The method of claim 1 wherein determining that no pipe flow corresponding to the winning first pipe currently needs to be serviced during the time unit includes accessing a pipe queue corresponding with the winning first pipe for pipe flows that need to be serviced and determining that no pipe flow corresponding to the winning first pipe entry currently needs to be serviced during the time unit.

Claim 7 (Original): The method of claim 3 wherein selecting the second winning entry from one of the plurality of main calendars during the time unit includes selecting a second entry of the chain.

Claim 8 (Original): The method of claim 2 wherein selecting the second winning entry from one of the plurality of main calendars during the time unit includes selecting the second winning entry from a calendar of a lower priority than the highest priority calendar.

Claim 9 (Previously Presented): The method of claim 8 wherein selecting the second winning entry from one of the plurality

of main calendars during the time unit includes selecting the second winning entry from the calendar of the lower priority than the highest priority calendar includes selecting the second winning entry from the highest priority calendar that has an entry indicating a pipe or autonomous flow to be serviced during the time unit.

Claim 10 (Previously Presented): The method of claim 1 wherein servicing the autonomous flow or pipe flow corresponding to the second winning entry during the time unit includes accessing a pipe queue corresponding to the second winning entry to select a pipe flow that needs to be serviced.

Claim 11 (Previously Presented): The method of claim 10 wherein servicing the autonomous flow or pipe flow corresponding to the second winning entry during the time unit includes servicing a highest priority pipe flow that is in the pipe queue a longest time.

Claim 12 (Previously Presented): A network processor system comprising:

at least one memory adapted to store one or more quality of service priority parameters corresponding to one or more pipes and pipe flows; and

scheduler logic, coupled to the at least one memory, to:

select a first winning entry from one of a plurality of main calendars during a time unit, the first winning entry indicating a first pipe to be serviced during the time unit;

determine that no pipe flow corresponding to the winning first pipe currently needs to be serviced during the time unit;

select a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating a second pipe or autonomous flow to be serviced during the time unit; and

service the autonomous flow or pipe flow corresponding to the second winning entry during the time unit.

Claim 13 (Previously Presented): The network processor system of claim 12 wherein the scheduler logic comprises:

the plurality of main calendars for storing at least one of the autonomous flow and a pipe that are scheduled to be serviced;

a plurality of secondary calendars for storing pipe flows that are scheduled to be serviced; and

a pipe queue table for storing a winning pipe flow in a queue for a pipe to which the pipe flow corresponds.

Claim 14 (Previously Presented): The network processor system of claim 12 wherein the scheduler logic further comprises:

enqueue and new attach logic for scheduling at least one of the autonomous flow and the pipe flow to be serviced; and

dequeue and reattach logic for selecting at least one of the autonomous flow and the pipe flow to be serviced.

Claim 15 (Original): A method comprising:

selecting a first winning entry from one of a plurality of main calendars during a time unit, the first winning entry indicating a first pipe to be serviced during the time unit;

determining that no pipe flow corresponding to the winning first pipe currently needs to be serviced during the time unit;

selecting a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating a second pipe to be serviced during the time unit; and
servicing a pipe flow corresponding to the second winning entry during the time unit.

Claim 16 (Original): A method comprising:

selecting a first winning entry from one of a plurality of main calendars during a time unit, the first winning entry indicating a first pipe to be serviced during the time unit;

determining that no pipe flow corresponding to the winning first pipe currently needs to be serviced during the time unit;

selecting a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating an autonomous flow to be serviced during the time unit; and

servicing the autonomous flow corresponding to the second winning entry during the time unit.

Claim 17 (Previously Presented): A network processor system comprising:

at least one memory adapted to store one or more quality of service priority parameters corresponding to one or more pipes and pipe flows; and

scheduler logic, coupled to the at least one memory, to:

select a first winning entry from one of a plurality of main calendars during a time unit, the first winning entry indicating a first pipe to be serviced during the time unit;

determine that no pipe flow corresponding to the

winning first pipe currently needs to be serviced during the time unit;

select a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating a second pipe to be serviced during the time unit; and

service a pipe flow corresponding to the second winning entry during the time unit.

Claim 18 (Previously Presented): A network processor system comprising:

at least one memory adapted to store one or more quality of service priority parameters corresponding to one or more pipes and pipe flows; and

scheduler logic, coupled to the at least one memory, to:

select a first winning entry from one of a plurality of main calendars during a time unit, the first winning entry indicating a first pipe to be serviced during the time unit;

determine that no pipe flow corresponding to the winning first pipe currently needs to be serviced during the time unit;

select a second winning entry from the plurality of main calendars during the time unit, the second winning entry indicating an autonomous flow to be serviced during the time unit; and

service the autonomous flow corresponding to the second winning entry during the time unit.

EVIDENCE APPENDIX

Not applicable

RELATED PROCEEDINGS APPENDIX

Not applicable